LP-171

Pico-ITX

User's Manual

Edition 1.0
2010/07/27



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Packing List:

Please check the package content before you starting using the board.

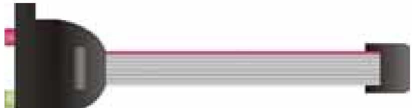
Hardware:

LP-171 PICO-ITX" Miniboard x 1

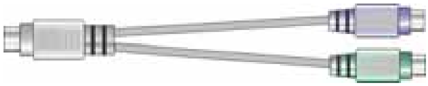
Cable Kit:



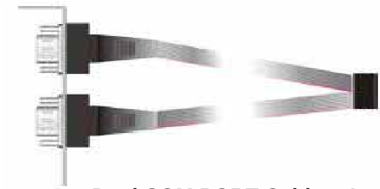
DC_IN Power Cable x 1
(OALDC-3)



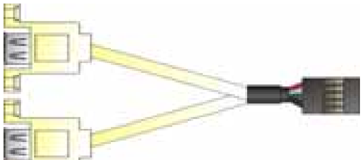
Audio Cable x 1
(OALPJ-HDUNB)



PS/2 keyboard & mouse Cable x 1
(OALPS2/MK)



Dual COM PORT Cable x 1
(OALES-BKU2NB)



USB Cable x 1
(OALUSBA-3)

Option:



Panel Inverter Cable x 1
(OALINV-5P-L15)



MPX-SDVOX power Cable x 1
(OAL4PS-6P)

Printed Matters:

Driver CD x 1 (Including User's Manual)

Index

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Chapter 1 <Introduction>

1.1 <Product Overview>

LP-171 is the PICO-ITX miniboard, with Intel® Atom Z510P processor for 400 MHz front side bus, Intel® US15WP SCH, integrated GMA500 graphics, DDR2 SO-DIMM memory, Realtek HD Audio, CF and one Intel® 82574L Gigabit LAN.

Intel® Atom Processor

The Intel® Atom Z510P single core processor is with 400 MHz front side bus,512KB L2 cache. It's built on 45nm process technology support Hyper-Threading Technology, Enhanced Intel® SpeedStep® Technology reduces average system power consumption.

Embedded Intel® SCH

The board integrates Intel® US15WP SCH. The chipset features power-efficient graphics with an integrated 32-bit 3D graphics engine based on Intel® Graphics Media Accelerator 500 architecture with DVI, LVDS, CRT display ports. It provides I/O capabilities and flexibility via high-bandwidth interfaces such as PCIE and Hi-Speed USB 2.0 connectivity. It also includes a single channel for 400 MHz DDR2 system memory (SODIMM), HD Audio.

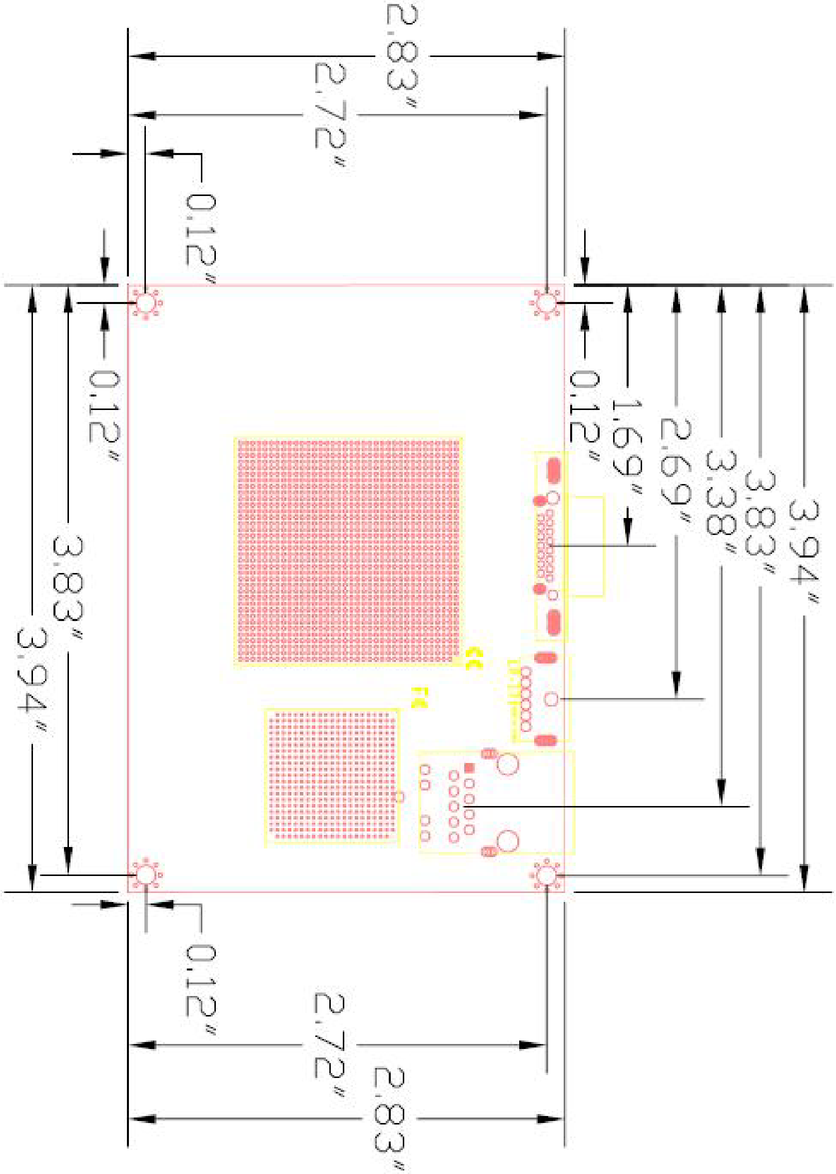
1.2 <Product Specification>

General Specification	
Form Factor	PICO-ITX miniboard
CPU	Intel® Atom™ Z510P processor 1.1GHz Package type: 437pin FCBGA8 with an IHS, Front side bus: 400MHz
Memory	1 x 200-pin DDR2 SO-DIMM SDRAM up to 2GB Unbufferred, none-ECC memory supported only *Memory chip with width x16 bits is strongly recommended!
Chipset	Intel® SCH US15WP
BIOS	Phoenix-Award v6.00PG 8Mb SPI flash BIOS
Green Function	Power saving mode includes doze, standby and suspend modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	System reset programmable watchdog timer with 1 ~ 255 sec./min. of timeout value
Real Time Clock	Intel® SCH built-in RTC with lithium battery
Enhanced IDE	One CompactFlash Type II socket on solder side
Multi-I/O Port	
Chipset	Intel® SCH with Winbond® W83627DHG controller
Serial Port	Two RS-232 serial port
USB Port	Four internal Hi-Speed USB 2.0 ports with 480Mbps of transfer rate
K/B & Mouse	PS/2 keyboard and mouse port
VGA Display Interface	
Chipset	Intel® US15WP SCH (System Controller Hub)
Frame Buffer	Up to 256MB shared with system memory
Display Type	CRT, LCD monitor with analog display **(LP-171QT only)**, DVI **(LP-171QD only)**
Connector	External DB15 female connector **(LP-171QT only)** External HDMI connector **(LP-171QD only)** Onboard 20-Pin LVDS and 5-Pin inverter connector
Ethernet Interface	
Controller	1 x Intel® 82574L Gigabit Ethernet controller
Type	Triple speed 10/100/1000Base-T auto-switching Fast Ethernet Full duplex, IEEE802.3U compliant
Connector	1 X External RJ45 connector with LED

Audio Interface	
Chipset	REALTEK ALC888
Interface	Stereo audio Line-out and MIC-in
Connector	Onboard audio connector with pin header
Expansive Interface	
PCIE mini card	1 x PCIE mini card socket
Power and Environment	
Power Requirement	DC 12V input with onboard 2-pin connector
Dimension	100 (L) x 72(H) mm
Temperature	Operating within 0 ~ 60℃ Storage within -20 ~ 85℃
Ordering Code	
LP-171QT	Support Intel® Atom Z510P processor with onboard **VGA**, LVDS, Audio, Giga LAN, USB2.0, CF , PCIE mini card
LP-171QD	Same as LP-171QT but without VGA, support **DVI**
LP-171QX	Same as LP-171QT but without VGA, supports **24bit** dual channel LVDS by **MPX-SDVOX** **(Note : Onboard MIni-PCIe socket support MPX-SDVOX only)**

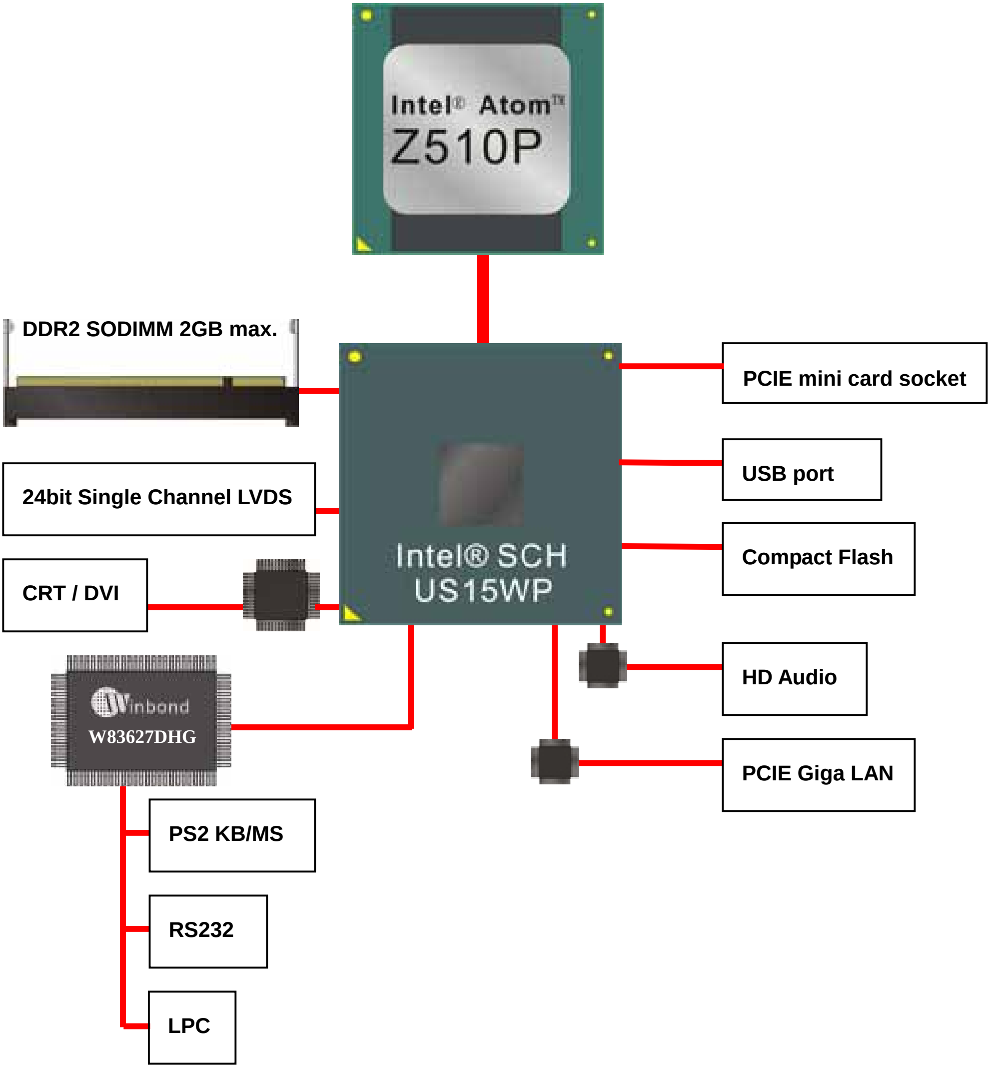
The specifications may be different as the actual production.
For further product information please visit the website at http://www.commell.com.tw

1.3 <Mechanical Drawing>



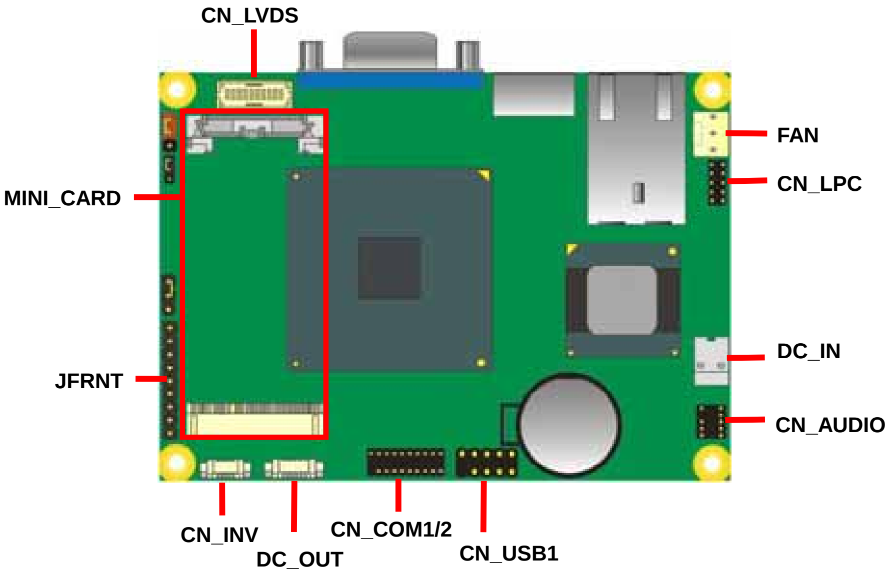
Unit: inch

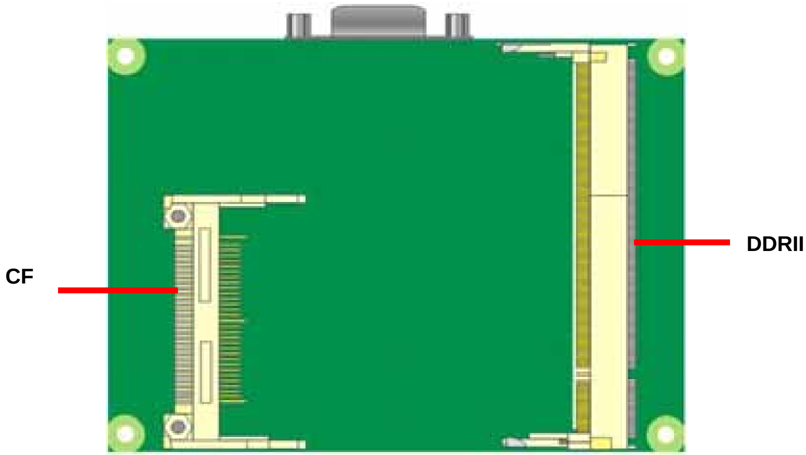
1.4 <Block Diagram>



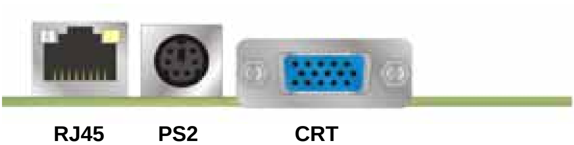
Chapter 2 <Hardware Setup>

2.1 <Connector Location>

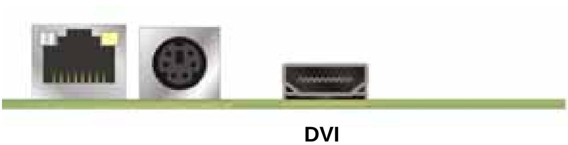




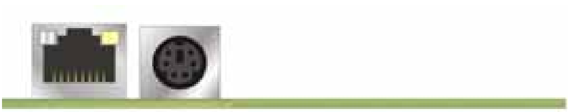
LP-171QT



LP-171QD

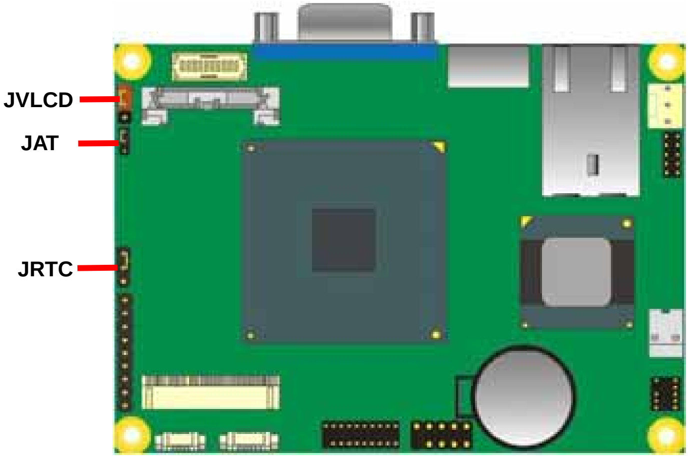


LP-171QX



2.2 <Jumper Reference>

Jumper	Function
JRTC	CMOS Operating/Clear Setting
JVLCD	LCD Panel Voltage Setting
JAT	AT/ATX Mode Setting



2.3 <Connector Reference>

2.3.1 <Internal Connector>

Connector	Function	Remark
DDRII	200 -pin DDR2 SO-DIMM SDRAM slot	Standard
CF	Compact Flash Type II socket	Standard
MINI_CARD	PCIE mini card socket	Standard
CN_LVDS	10 x 2-pin LVDS connector	Standard
CN_INV	5-pin LCD inverter connector	Standard
CN_USB	5 x 2-pin USB connector	Standard
CN_AUDIO	5 x 2-pin audio connector	Slim
CN_COM1/2	10 x 2-pin com connector	Slim
JFRNT	8-pin switch/indicator connector	Standard
FAN	3-pin system cooler fan connector	Standard
DC_OUT	6-pin power output connector	Standard
DC_IN	DC input connector	Standard

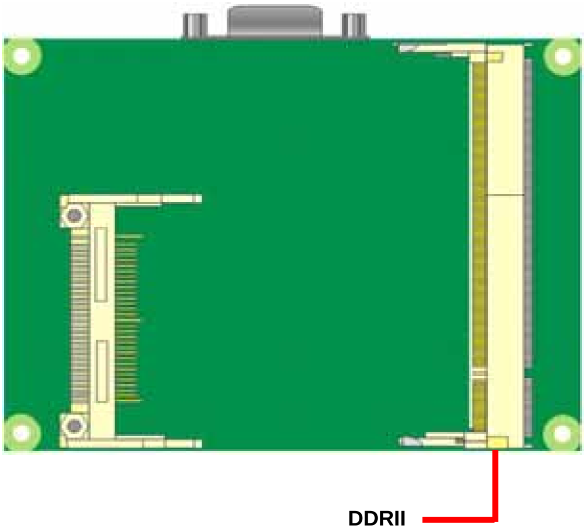
2.3.2 <External Connector>

Connector	Function	Remark
CRT	DB15 VGA connector	Standard
HDMI	Type A HDMI connector	Standard
PS2	PS/2 keyboard and mouse connector	Standard
RJ45	RJ45 LAN connector	Standard

2.4 <CPU and Memory Setup>

The board provides one 200-pin DDR2 SO-DIMM to support DDR2 400 memory modules up to 2GB of capacity. Non-ECC, unbuffered memory is supported only.

***Memory chip with width x16 bits is strongly recommended!**



2.5 <CMOS & ATX Setup>

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: **JRTC**

Type: Onboard 3-pin jumper

JRTC	Mode
1-2	Clear CMOS
2-3	Normal Operation

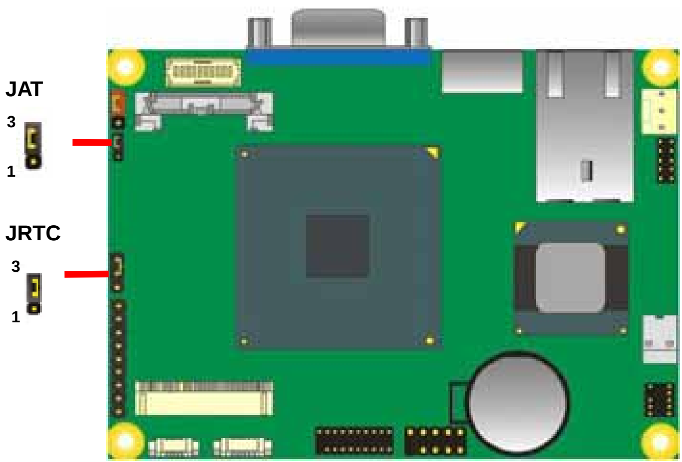
Default setting

Jumper: **JAT**

Type: onboard 3-pin jumper

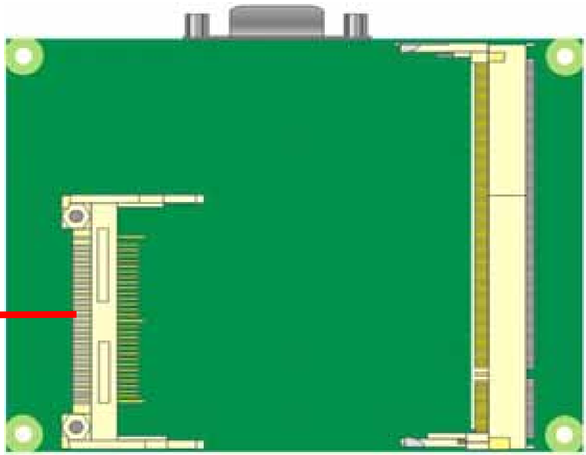
JAT	Mode
1-2	AT Mode
2-3	ATX Mode

Default setting



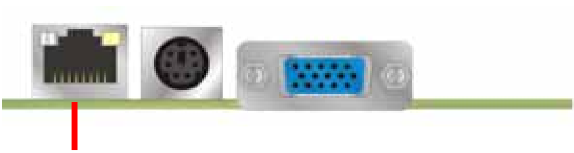
2.6 <CF Interface>

The board has one Compact Flash Type II socket on the solder side.



2.7 <LAN Interface>

The Intel® 82574L supports triple speed of 10/100/1000Base-T, with IEEE802.3 compliance.



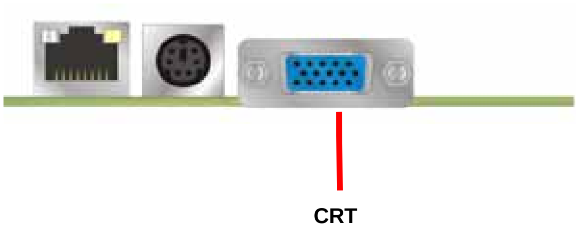
2.8 <Onboard Display Interface>

Based on Intel® SCH chipset with built-in GMA (Graphic Media Accelerator) 500 graphics, the board provides one DB15 or HDMI connector on real external I/O port, and one 20-pin LVDS interface with 5-pin LCD backlight inverter connector. The board provides dual display function with clone mode and extended desktop mode for CRT, DVI and LVDS.

2.8.1 <Analog VGA Interface> (LP-171QT only)

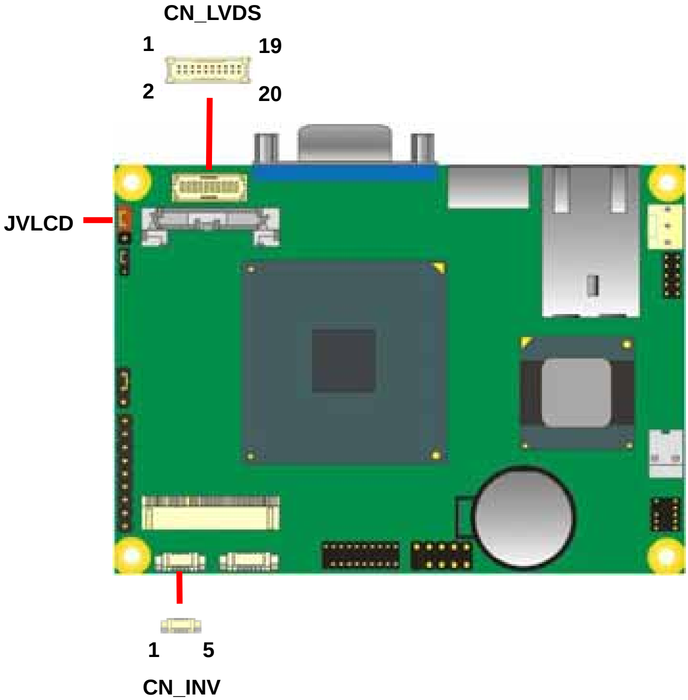
Please connect your CRT or LCD monitor with DB15 male connector to the onboard DB15 female connector on rear I/O port.

The board supports up to 1920 x 1080 (WUXGA) of resolution.



2.8.2 <Digital Display>

The board provides one 20-pin LVDS connector for 18 or 24 bit single channel panels, supports up to 1920 x 1080 (WUXGA) of resolution, with one LCD backlight inverter connector and one jumper for panel voltage setting



Connector: **CN_INV**
Type: 5-pin Inverter power connector
Connector model: **molex_53261-5pin**

Pin	Description
1	+12V
2	GND
3	GND
4	GND
5	ENABKL

Jumper: **JVLCD**
Type: 3-pin Power select jumper

Pin	Description
1-2	+5V
2-3	+3.3V

Default: 2-3

Connector: **CN_LVDS**
Type: onboard 20-pin connector for LVDS connector
Connector model: **HIROSE DF13-20DP-1.25V**

Pin	Signal	Pin	Signal
2	LCDVCC	1	LCDVCC
4	GND	3	GND
6	TXL0P	5	TXL0N
8	TXL1N	7	GND
10	GND	9	TXL1P
12	TXL2P	11	TXL2N
14	TXLCKN	13	GND
16	GND	15	TXLCKP
18	TXL3P	17	TXL3N
20	GND	19	GND

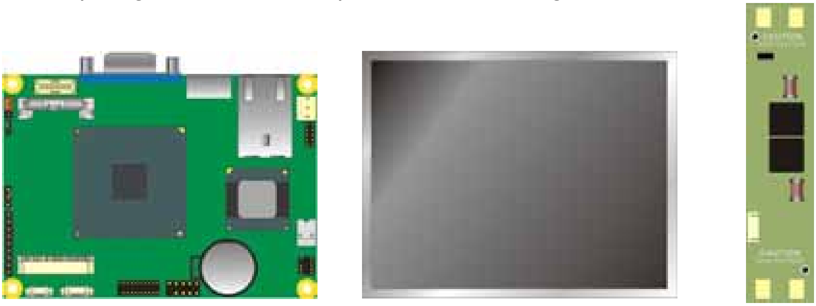
To setup the LCD, you need the component below:

1. A panel with LVDS interfaces.
2. An inverter for panel's backlight power.
3. A LCD cable and an inverter cable.

For the cables, please follow the pin assignment of the connector to make a cable, because every panel has its own pin assignment, so we do not provide a standard cable; please find a local cable manufacture to make cables.

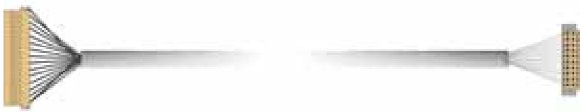
LCD Installation Guide:

1. Preparing the LP-171, LCD panel and the backlight inverter



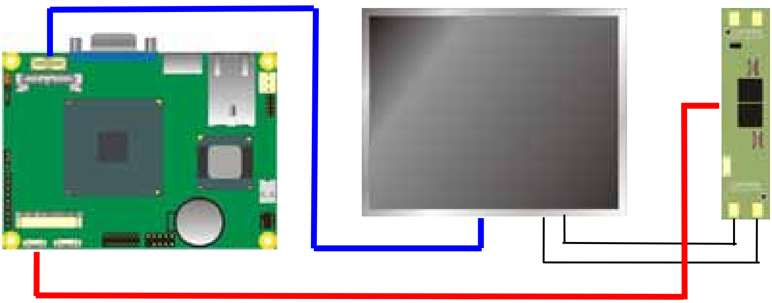
2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +5V or +3.3V.
3. You would need a LVDS type cable.

Panel side



Board side

4. To connect all of the devices well.



After setup the devices well, you need to select the LCD panel type in the BIOS.



The panel type mapping is list below:

LP-171T/ D/ X BIOS panel type selection form			
On board Single channel LVDS			
18bit		24bit	
NO.	Output format	NO.	Output format
1	640 x 480	9	640 x 480
2	800 x 480	10	800 x 480
3	800 x 600	11	800 x 600
4	1024 x 600	12	1024 x 768
5	1024 x 768	13	1280 x 720
6	1280 x 768	14	1280 x 768
7	1280 x 800	15	1366 x 768
8	1400 x 1050		
LP-171X + MPX-SDVOX BIOS panel type selection form			
MPX-SDVOX Daul channel LVDS			
Output format			
1	1280 x 1024 24bit		

The " LP-171X + MPX-SDVOX " supports dual channel 24bit LVDS, if need support other resolution flat panel, please contact Commell tech support team for customize BIOS and driver.

2.8.3 <DVI Interface >(LP-171QD only)

The board also comes with a DVI interface with Chrontel CH7307C for digital video interface. Supports up to 1600 x 1200 (UXGA) of resolution.

Connector: **HDMI**

Connector type: 19-pin Type A HDMI connector

Pin Number	Assignment	Pin Number	Assignment
1	TMDS_D2+	2	Ground
3	TMDS_D2-	4	TMDS_D1+
5	Ground	6	TMDS_D1-
7	TMDS_D0+	8	Ground
9	TMDS_D0-	10	TMDS_CLK+
11	Ground	12	TMDS_CLK-
13	N/C	14	N/C
15	DVI_SCL	16	DVI_SDA
17	Ground	18	PVDD
19	HPDET		



DVI

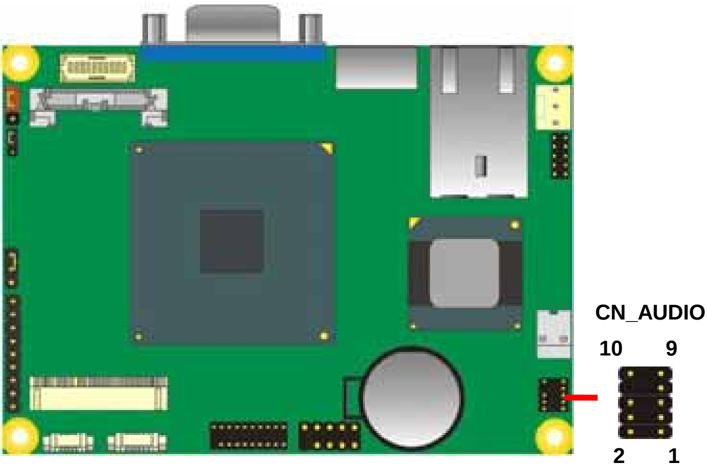
2.9 <Onboard Audio Interface>

The board provides the onboard high definition audio with Realtek ALC888

Connector: CN_AUDIO

Type: 10-pin (2 x 5) 1.27mm x 2.54mm-pitch header

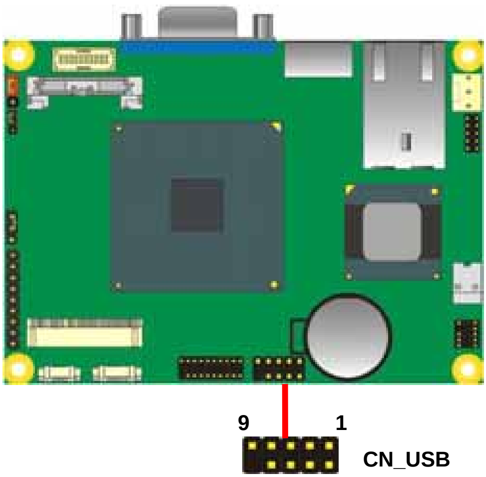
Pin	Description	Pin	Description
1	MIC_L	2	Ground
3	MIC_R	4	AVCC
5	FRO_R	6	MIC_JD
7	SENSE	8	N/C
9	SPK_L	10	LINE2_JD



2.10 <USB2.0 Interface>

Based on Intel® SCH, the board provides 2 USB2.0 ports. The USB2.0 interface provides up to 480Mbps of transferring rate.

Interface	USB2.0
Controller	US15WP
Transfer Rate	Up to 480Mb/s
Output Current	500mA



Connector: **CN_USB**
Type: 10-pin (5 x 2) header for USB Port

Pin	Description	Pin	Description
1	VCC	2	VCC
3	Data0-	4	Data1-
5	Data0+	6	Data1+
7	Ground	8	Ground
9	Ground	10	N/C

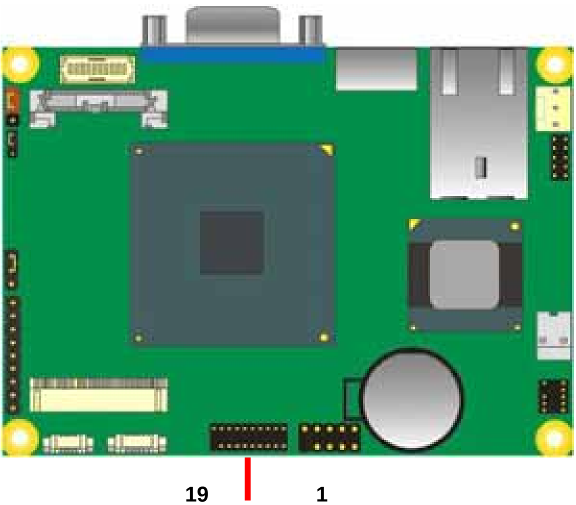
2.11 <Serial Port Jumper Setting >

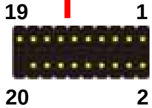
The board provides two RS232 serial ports,

Connector: **CN_COM1/2**

Type: 20-pin (5 x 2) 1.27mm x 2.54mm-pitch header for COM1/2

Pin	Description	Pin	Description
1	MDCD1	2	MSIN1
3	MSO1	4	MDTR1
5	GND	6	MDSR1
7	MRTS1	8	MCTS1
9	MRI1	10	NC
11	MDCD2	12	MSIN2
13	MSO2	14	MDTR2
15	GND	16	MDSR2
17	MRTS2	18	MCTS2
19	MRI2	20	NC





CN_COM1/2

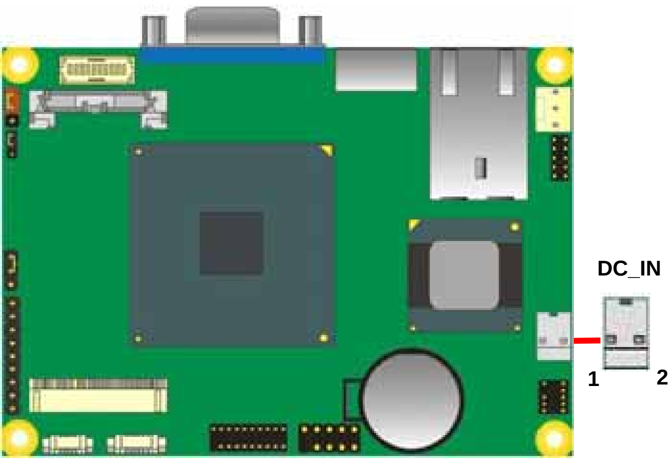
2.12 <Power & FAN Connector >

The board requires DC input with 2-pin header, the input voltage is 12V, for the input current, please take a reference of the power consumption report on appendix.

2.12.1 <Power Input>

Connector: DC_IN
Type: 2-pin header

Pin	Description	Pin	Description
1	Ground	2	+12V



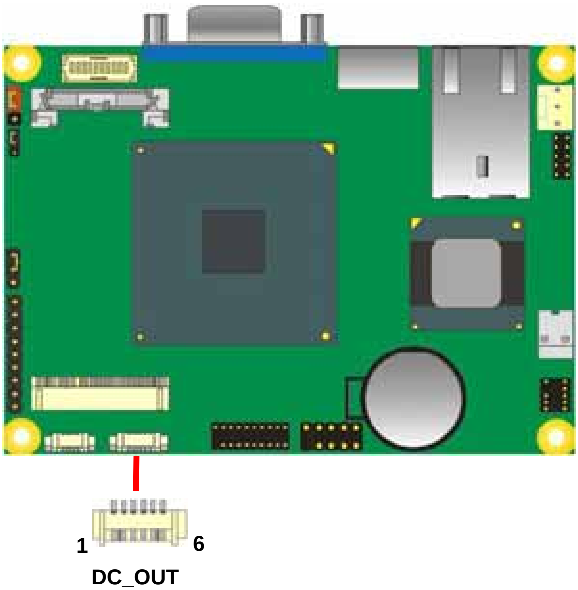
2.12.2 <Power Output>

Connector: **DC_OUT**

Type: 6-pin connector for +5V/+12V **output**

Pin	Description
1	+12V
2	+12V
3	GND
4	GND
5	+5V
6	+5V

Note: Maximum output current 12V/1A, 5V/1A

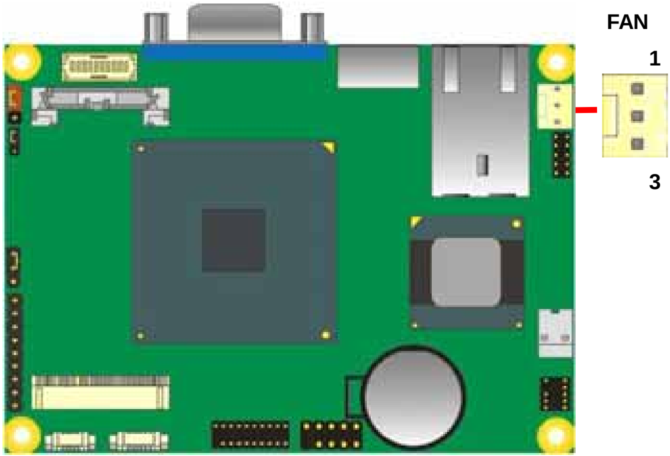


2.12.3 <Fan Connector>

Connector: **SYSFAN, CPUFAN**

Type: 3-pin fan wafer connector

Pin	Description	Pin	Description	Pin	Description
1	Ground	2	+12V	3	Speed detect



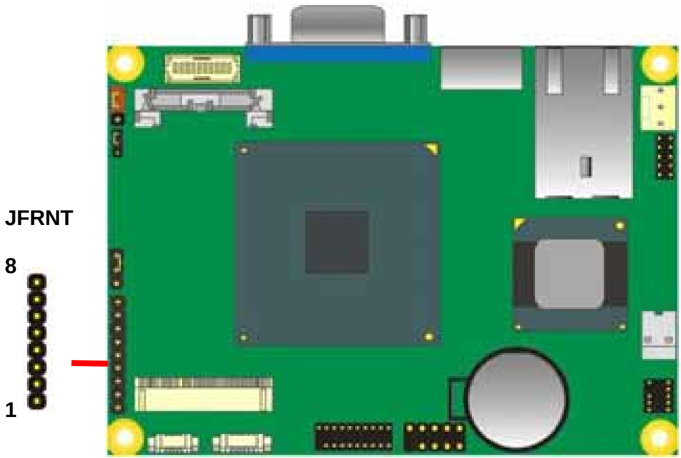
2.13 <Indicator and Switch>

The **JFRNT** provides front control panel of the board, such as power button, reset, etc.

Please check well before you connecting the cables on the chassis.

Connector: **JFRNT**
Type: onboard 8-pin (1 x 8) 2.54-pitch header

Function	Signal	PIN
Reset	Reset+	8
	Reset-	7
Power LED	PWRLED-	6
	PWRLED+	5
HDD LED	HDLED-	4
	HDLED+	3
Power	PWRBT-	2
	PWRBT+	1



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Chapter 3 <BIOS Setup>

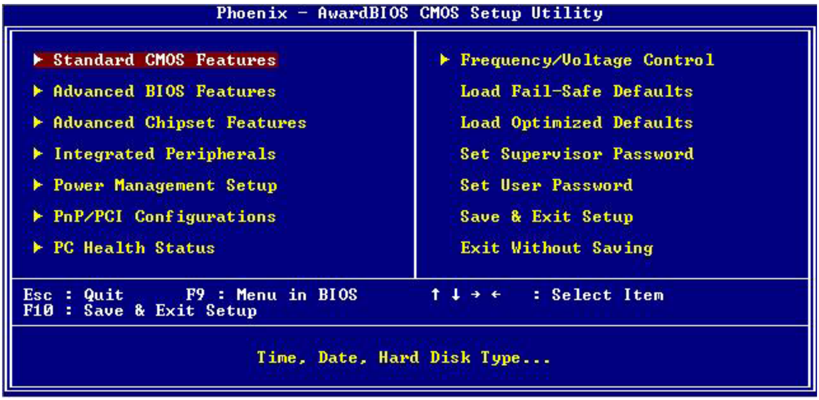
The motherboard uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel® x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press ＜DEL＞ key immediately after you turn on the system. The following message “Press DEL to enter SETUP” should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 4-1**. You can use arrow keys to select your function, press ＜Enter＞ key to accept the selection and enter the sub-menu.

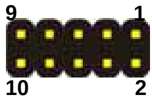
Figure 4-1 CMOS Setup Utility Main Screen



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Appendix A <I/O Port Pin Assignment>

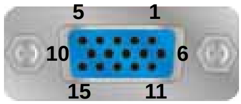
A.1 <LPC Port>



Connector: **CN_LPC**
Type: 10-pin header for LPC Port

Pin	Description	Pin	Description
1	LPC_CLK	2	RESET-
3	LFRAME-	4	LAD3
5	LAD2	6	LAD1
7	LAD1	8	+3.3V
9	Ground	10	Ground

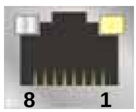
A.2 < CRT Port >



Connector: CRT
Type: 15-pin D-sub female connector on rear panel

Pin	Description	Pin	Description	Pin	Description
1	RED	6	Ground	11	N/C
2	GREEN	7	Ground	12	5VCDA
3	BLUE	8	Ground	13	HSYNC
4	N/C	9	LVGA5V	14	VSYNC
5	Ground	10	Ground	15	5VCLK

A.3 <LAN Port>



Connector: **RJ45**
Type: RJ45 connector with LED on rear panel

Pin	1	2	3	4	5	6	7	8
Description	TRD0+	TRD0-	TRD1+	TRD2+	TRD2-	TRD1-	TRD3+	TRD3-

Appendix B <Flash BIOS>

B.1 BIOS Auto Flash Tool

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

http://www.award.com
http://www.commell.com.tw/support/support.htm

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

B.2 Flash Method

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy awardflash.exe to the disk.
4. Power on the system and flash the BIOS. (Example: C:/ awardflash XXX.bin)
5. Re-star the system.

Any question about the BIOS re-flash please contact your distributors or visit the web-site at below:

http://www.commell.com.tw/support/support.htm

Appendix C <System Resources>

C.1 <I/O Port Address Map>

[00000000 - 0000000F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000061 - 00000061] System speaker
[00000062 - 00000063] Motherboard resources
[00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000065 - 0000006F] Motherboard resources
[00000070 - 00000073] System CMOS/real time clock
[00000074 - 0000007F] Motherboard resources
[00000080 - 00000090] Direct memory access controller
[00000091 - 00000093] Motherboard resources
[00000094 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000FF] Numeric data processor
[00000170 - 00000177] Secondary IDE Channel
[000001F0 - 000001F7] Primary IDE Channel
[00000274 - 00000277] ISAPNP Read Data Port
[00000279 - 00000279] ISAPNP Read Data Port
[000002F8 - 000002FF] Communications Port (COM2)
[00000376 - 00000376] Secondary IDE Channel
[000003F8 - 000003FF] Communications Port (COM1)
[000004D0 - 000004D1] Motherboard resources
[00000880 - 0000088F] Motherboard resources
[00000900 - 000009BF] Motherboard resources
[00000A79 - 00000A79] ISAPNP Read Data Port
[00000D00 - 0000FFFF] PCI bus
[0000D000 - 0000DFFF] Intel(R) SCH Family PCI Express Root Port 3 - 8112
[0000DB00 - 0000DB0F] Standard Dual Channel PCI IDE Controller
[0000DC00 - 0000DC03] Standard Dual Channel PCI IDE Controller
[0000DD00 - 0000DD07] Standard Dual Channel PCI IDE Controller
[0000DE00 - 0000DE03] Standard Dual Channel PCI IDE Controller
[0000DF00 - 0000DF07] Standard Dual Channel PCI IDE Controller

[0000E000 - 0000EFFF] Intel(R) SCH Family PCI Express Root Port 1 - 8110
[0000EF00 - 0000EF1F] Intel(R) 82574L Gigabit Network Connection
[0000FB00 - 0000FB0F] Standard Dual Channel PCI IDE Controller
[0000FC00 - 0000FC1F] Intel(R) SCH Family USB Universal Host Controller - 8116
[0000FD00 - 0000FD1F] Intel(R) SCH Family USB Universal Host Controller - 8115
[0000FE00 - 0000FE1F] Intel(R) SCH Family USB Universal Host Controller - 8114
[0000FF00 - 0000FF07] Intel(R) Graphics Media Accelerator 500

C.2 <Memory Address Map >

[00000000 - 0009FFFF] System board
[000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator 500
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[000E0000 - 000EFFFF] PCI bus
[000E0000 - 000EFFFF] System board
[000F0000 - 000FFFFF] PCI bus
[000F0000 - 000FFFFF] System board
[00100000 - 7F6DFFFF] System board
[7F6E0000 - 7F6FFFFF] System board
[7F700000 - 7F7FFFFF] System board
[7F800000 - FEBFFFFF] PCI bus
[D8000000 - DFFFFFFF] Intel(R) Graphics Media Accelerator 500
[E0000000 - EFFFFFFF] Motherboard resources
[FDB00000 - FDBFFFFF] Intel(R) SCH Family PCI Express Root Port 3 - 8112
[FDC00000 - FDCFFFFF] Intel(R) SCH Family PCI Express Root Port 1 - 8110
[FDD00000 - FDDFFFFF] Intel(R) SCH Family PCI Express Root Port 1 - 8110
[FDDC0000 - FDDDFFFF] Intel(R) 82574L Gigabit Network Connection
[FDDFC000 - FDDFFFFF] Intel(R) 82574L Gigabit Network Connection
[FDE00000 - FDEFFFFF] Intel(R) SCH Family PCI Express Root Port 3 - 8112
[FDF00000 - FDF7FFFF] Intel(R) Graphics Media Accelerator 500
[FDFC0000 - FDFDFFFF] Intel(R) Graphics Media Accelerator 500
[FDFF8000 - FDFFBFFF] Microsoft UAA Bus Driver for High Definition Audio
[FDFFD000 - FDFFD0FF] SDA Standard Compliant SD Host Controller
[FDFFE000 - FDFFE0FF] SDA Standard Compliant SD Host Controller
[FDFFF000 - FDFFF3FF] Intel(R) SCH Family USB2 Enhanced Host Controller - 8117
[FEC00000 - FEC00FFF] System board
[FED00000 - FED000FF] System board
[FED00000 - FED003FF] High precision event timer
[FED13000 - FED1DFFF] System board
[FED20000 - FED8FFFF] System board
[FEE00000 - FEE00FFF] System board
[FFB00000 - FFB7FFFF] System board
[FFB80000 - FFBFFFFF] Intel(R) 82802 Firmware Hub Device
[FFF00000 - FFFFFFFF] System board

C.3 < System IRQ Resources >

(ISA) 0 High precision event timer
(ISA) 1 Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA) 3 Communications Port (COM2)
(ISA) 4 Communications Port (COM1)
(ISA) 8 High precision event timer
(ISA) 9 Microsoft ACPI-Compliant System
(ISA) 12 PS/2 Compatible Mouse
(ISA) 13 Numeric data processor
(PCI) 16 Intel(R) 82574L Gigabit Network Connection
(PCI) 16 Intel(R) Graphics Media Accelerator 500
(PCI) 16 Intel(R) SCH Family PCI Express Root Port 1 - 8110
(PCI) 16 Intel(R) SCH Family USB Universal Host Controller - 8114
(PCI) 16 Intel(R) SCH Family USB Universal Host Controller - 8115
(PCI) 16 Microsoft UAA Bus Driver for High Definition Audio
(PCI) 16 SDA Standard Compliant SD Host Controller
(PCI) 17 Intel(R) SCH Family PCI Express Root Port 3 - 8112
(PCI) 17 SDA Standard Compliant SD Host Controller
(PCI) 17 Standard Dual Channel PCI IDE Controller
(PCI) 18 Intel(R) SCH Family USB Universal Host Controller - 8116
(PCI) 19 Intel(R) SCH Family USB2 Enhanced Host Controller - 8117

Appendix E <Watch Dog timer Setting >

The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

Timeout Value Range

- 1 to 255
- Second or Minute

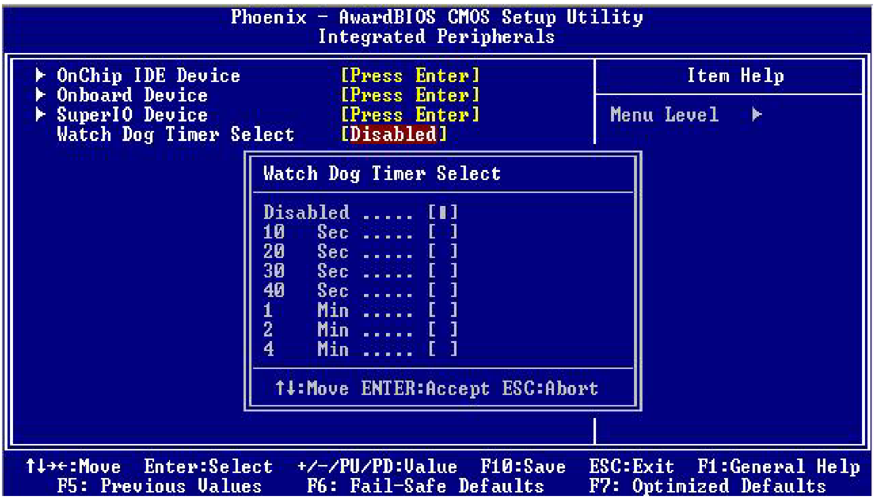
Program Sample

Watchdog timer setup as system reset with 5 second of timeout

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	
2F, 01	Activate
2E, F5	
2F, 00	Set as Second*
2E, F6	
2F, 05	Set as 5

* Minute: bit 3 = 1; Second: bit 3 = 0

You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.



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Contact Information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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